

Contraception calculator

The use of the pill for contraception is accompanied by side effects and affects a woman's hormonal balance. The Ogino-Knaus method, although it must be learnt and requires manual recording and evaluation of data, has therefore [lacuna]. For this reason, the invention proposes:

contraception using the

10        OGINO-KNAUS CALCULATOR.

The machine comprises  
digital clock (possibly with date)  
charging and battery part with automatic  
changeover

15        temperature measurement sensor

acoustic signal generator

input keys

display keys

security keys against unauthorized use

20        calculator, simultaneously controlling the  
following domains:

clock, temperature measurement, data  
recording, data evaluation, battery  
checking, displays, lamps

25        lamps

possibly magnetic cassette for data storage  
(can be evaluated in a medical computer at the  
gynaecologist's).

30        The machine is intended to perform the  
following tasks:

a) clock with alarm, possibly with date

b) clinical thermometer

c) contraception calculation based on 3 methods  
simultaneously

35        d) advise doctor's appointment

I) using the method based on the cycle length  
after which a woman is fertile in the interval (min. CL  
- 18, max. CL - 10),

II) using the temperature measurement method  
(earl. temp. change -6, temp. change +3)

III) using the temperature measurement method,  
taking the last measurement as a basis (1, temp. change  
5 +3).

The reliability of the indications is almost as  
high with method III) as with the pill = ovulation  
inhibitor.

The reliability is output in % on the clock  
10 display, as is other data after the appropriate display  
key has been pressed for 1/2 min. Methods I) and II)  
are estimates based on the variation in the data. The  
calculator searches for the method for which it has the  
best data and most reliable results available. If the  
15 data is also recorded on a cassette, the gynaecologist  
can quickly obtain an overview of the problems on a  
dedicated medical calculator, using the cassette. Exact  
orientation is also possible for the husband without  
any psychological difficulty, because the lamps  
20 indicate the safe time.

#### Morning temperature measurement

The alarm signals when it is time to get up and  
take a measurement. The sensor is taken from the  
holder, the alarm switches itself off, and the  
25 appliance is switched over from the mains to the  
battery for voltage protection. The measurement process  
starts. The second alarm indicates the end of  
measurement. The sensor is put back in the holder and  
data processing starts after the security keys and the  
30 temperature entry keys have been pressed during a third  
control buzzer. Further input keys can be actuated  
immediately or else during the day. For cleaning  
purposes, the measurement sensor is attached to a  
waterproof cable and can be fitted into the appliance.  
35 The appliance runs on an isolating transformer. On  
trips, the appliance is battery-operated; the digit  
displays are then turned off, and solar cells can also  
be used for the power supply (developing countries).  
If, during data processing, there is another entry,

this is temporarily stored and then used in a second cycle, or no buzzer is sounded, i.e. data is entered again.

The evaluation algorithms must achieve the following:

- 5           A) indicate whether it is necessary to go to the doctor's,  
            B) indicate whether it is a safe day,  
            C) select the correct method I) and II) or III) for this,  
10           D) and calculate probabilities of this,  
            E) take into account and possibly interpolate missing values, and calculate the following values and put them into a memory:
- Temperature, date and all other data from the  
15   input keys  
            Days since last period  
            Length of max. cycle  
            Length of min. cycle, possibly not taking into account data from a long time ago through dual  
20   storage  
            Earl. temperature rise  
            Lat. temperature rise  
            Length of last period  
            Calculate day of temperature rise  
25   Display keys  
            turn clock display off for one min.  
            1) temperature measured: this also turns the appliance into a simple clinical thermometer. Pressing it displays the measured value, and pressing it a 2nd  
30   time within the next minute displays the temperature for the day before and so on for all temperature entries from the last few days. After 8 min., alarm can be made to buzz.
- 2) days since last period (day of period)  
35   x 3) max. period: days  
            x 4) min. period: days  
            x 5) earliest temperature rise: period day  
            x 6) latest temperature rise: period day

x 7) days until change: from safe to unsafe, or otherwise accordingly

8) length of period: first press for last period, second press for last but one etc. up to third period

9) reliability in %: indication of the % reliability of computer statement from lamp displays. If a display key has been pressed for 1 min. previously, latter's statement..

(x means input option along with value input key within 1 min. of it being pressed. Each press of the x key increases the value on the clock display by 1, starting from 0. 1 min. after the last press, the clock is turned on again and the last value displayed is stored)

(poss. combination with clock adjustment)

(poss. contact for additional time switch for radio)

#### Lamps

- 1) green: safe time, how safe see above
- 2) red: unsafe time, see above
- 3) blue: seek medical advice

If red and green light up simultaneously, no indication is possible.

- 4) red: mains and battery check: if the power fails, the battery is automatically used, the lamp is turned on and the clock display is turned off; during battery operation, if 2/3 empty, then red.

Only pressing the two security keys at the same time enables the operation of

#### Input keys

(B means buzzer is sounding or light when depressed)

- 1) B clear last entry: the input key pressed subsequently clears the appropriate function

2) B temperature entry: the temperature measured by the temperature sensor and displayed by the analogue/digital converter is stored in a cell which

was selected using the built-in clock and the calculator.

3) B period entry: a bit is set in the cell selected as above

5 4) B mucus: ditto

5) B illness or medicaments: ditto

6) B awake at night: ditto

7) B value input: after pressing the key, the clock display is turned off for 1 min. and the values  
10 can be entered using the appropriate display keys. These values are enumerated sequentially on the clock display for visual checking.

For security from playing children, the two security keys are built in, although these can be  
15 turned off by changing over the appliance. They are located on the front and back of the appliance. The changeover switch is located on the base of the appliance in the form of a penny-slot switch. A second changeover switch switches over between mains and  
20 battery operation. The clock display is turned off and, for 1 min., a separate key can be turned on instead.

(Security key)

Other entries can be important for the doctor:

8) B intercourse

25 9) Sickness, vomiting / B

10) B heavy period

11) B discharge

Memory (poss. on cassettes)

Besides the program memory and the  
30 computational registers, the following memories need to be present:

1.  $2^6 = 64 = 39 + 25$  memory cells for the entry of daily features

35 Temperature in 5 or 6 bits from 36 - 39.2°C min. = no entry

Period: 1 bit

Mucus: 1 bit

Illness: 1 bit

Awake at night: 1 bit organized as a stack

39 days for normal menstruation, the other 25 to recognize irregular intermenstrual bleeding or excessively long periods

2. Register: 6 bits to indicate the period day.  
5 It is advanced to 8.00 pm, since periods are counted from then on to the next day.

3. Register: 4 bits to indicate the number of periods up to 16. Then recalculation as described below.

10 4. Register: 3 times 4 bits for the lengths of the last 3 periods

5. Max. period register: 2 times 4 bits. The values are obtained by adding to the min. PR. Thus, only spacing stored.

15 6. Min. PR: 2 times 5 bits.

7. Earliest temperature rise: 2 x 4 bits: since the earl. temperature rise is not to be expected before the 8th day, values obtained by adding 8.

20 8. Latest t.: 2 times 4 bits: values can be obtained by adding earl. t.: hence, only spacing stored.

When register 3 is full, registers 4, 5, 6, 7 are re-stored on the basis of the following calculation:

25 The values for the last 8 (16) periods have been optimized in the NEW memory parts. The values are re-stored on the basis of OLD and then NEW is cleared.

In this way, values which are not too old are used for the calculation relating to OLD and NEW; thus,  
30 as a rule, 32 values taken into account. = 2.8 years or 16 values 1.4 years, if just re-stored.

Patent Claims:

Contraception calculator, characterized in that

- 5       1. it incorporates a digital clock, an electronic thermometer, an acoustic signal generator, a battery/charging part, input keys, display keys, security keys, lamps, possibly a magnetic cassette and a microprocessor for simultaneously controlling all the parts;
- 10       2. it performs the following tasks: clock with alarm and date, a clinical thermometer, contraception calculation based on 3 methods, indication of data with the appropriate security, a doctor's appointment;
- 15       3. the algorithms on the basis of medical facts achieve points A - E (see p. 3);
4. the special input, display and security keys, the operation of the lamps and the dual function of the clock display as timer and data generator, e.g. for percentage reliability, numbers of days etc. [lacuna]